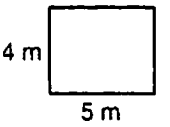
Name _____ Date _____ Class _____

SKILL 12: PROBLEM SOLVING: Changing Dimensions and Effect on Area and Perimeter

When you change the dimensions of a rectangle, the perimeter and the area change.

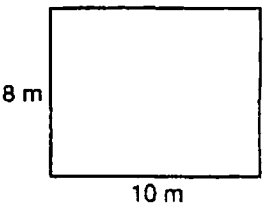
Example

Patty Petunia has a rectangular garden 5 m long and 4 m wide. She decides to enlarge the garden by doubling the dimensions. What is the effect on the perimeter of the garden? What is the effect on the area?



Add the lengths of the sides to find the perimeter of the original garden:
5 m + 4 m + 5 m + 4 m = 18 m

Add the lengths of the sides of the enlarged garden:
10 m + 8 m + 10 m + 8 m = 36 m



Compare the perimeter of the original garden to the enlarged garden.
Think: 18 × 2 = 36.

Doubling the dimensions of the original garden doubles the perimeter.

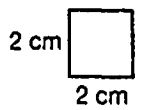
Multiply to find the area of the original garden: 5 m × 4 m = 20 m^2

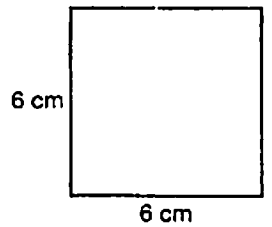
Multiply to find the area of the enlarged garden: 10 m × 8 m = 80 m^2
Compare the area of the original garden to the area of the enlarged garden.
Think: 20 × 4 = 80.

Doubling the dimensions of the original garden multiplies the area by 4.

Guided Practice

Find the effect of changing dimensions on the perimeter and area.





1. What is the perimeter of the original square? _____
2. What is the perimeter of the enlarged square? _____
3. How has the perimeter changed? 8 × ? = 24
   Multiplying the dimensions of a square by _____
   changes the perimeter of the square by a factor of _____.
4. What is the area of the original square? _____
5. What is the area of the enlarged square? _____
6. How has the area changed? ? × 4 = 36
   Multiplying the dimensions of a square by _____
   changes the area of the square by a factor of _____.

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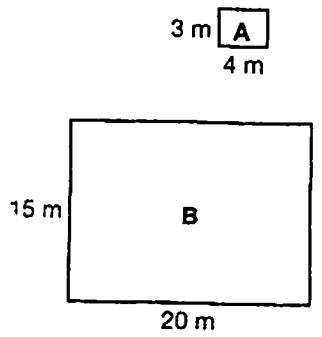
SKILL 12: Practice

1. Rectangle A has been enlarged to make Rectangle B.

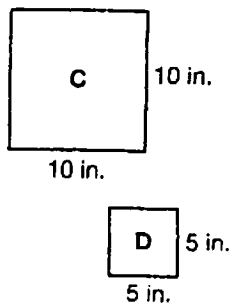


a. The dimensions of Rectangle B are each how many times as long as the dimensions of Rectangle A? _____

b. The perimeter of Rectangle B is _____ times as great as the perimeter of Rectangle A.

c. The area of Rectangle B is _____ times as great as the area of Rectangle A.

2. Square C has been reduced to make Square D.



a. The dimensions of Square D are each how many times as long as the dimensions of Square C? _____

b. The perimeter of Square D is _____ times as great as the perimeter of Square C.

c. The area of Square D is _____ times as great as the area of Square C.

Solve.

3. A fenced-in garden is 30 ft by 60 ft. A new garden is planned that will have dimensions $\frac{1}{3}$ the size of the original garden. How does the length of fence around the new garden compare with the length of fence around the original garden?

_____

4. A corral measures 10 ft by 12 ft. The corral is rebuilt with the dimensions doubled. How does the area of the rebuilt corral compare with the area of the original corral?

_____

5. Taylor has a pattern for a flag that is 100 cm long on each side. He decides to reduce the pattern by halving the dimensions. What is the effect on the area?

_____

6. The dimensions of a square are 6 m by 6 m. How does the area of the square change if the dimensions of the square are multiplied by 4?

Skill 12

A The area is doubled.
B The area is multiplied by 4.
C The area is multiplied by 8.
D The area is multiplied by 16.

7. The area of a parallelogram is 522 m^2. If the height of the parallelogram is 18 m, how long is the base?

Skill 10

F 28 m
G 29 m
H 208 m
J 209 m